

## INITIATING A WIRELESS CONNECTION TO A BROADCAST PROGRAM

### FIELD OF THE INVENTION

[01] The invention relates generally to mobile telecommunications networks. More specifically, the invention provides a method and system for initiating a connection between a mobile terminal and a call-in show based on a current channel to which the mobile terminal is tuned.

### BACKGROUND OF THE INVENTION

[02] Call-in radio and television talk shows often provide a telephone number or email address through which listeners or viewers can contact the show (e.g., to talk to the show's host while the show is on the air). Radio call-in shows typically provide the call-in telephone number by announcing it over the air. If an audience member does not hear the telephone number, e.g., because the audience member tuned into the show already in progress, then the audience member cannot call in to the show. In addition, telephone numbers are often spoken very fast, leading to the possibility that a listener may not be able to write down the number, especially while driving a car or when the listener's eyes and/or hands are busy.

[03] Even when an audience member does call a show, the audience member must often redial the number many times before getting through due to high volumes of calls being placed to the call-in number at the same time. When the audience member does get through, the call is often placed in a long queue, and the audience member must then wait for long periods of time before speaking to an operator or other person(s) handling incoming telephone calls, because the show's host rarely handles incoming calls.

[04] Call-in programs often use commercial or third party call centers to handle and/or screen incoming telephone calls. The call center typically must employ many paid operators who each answer calls, screen callers for appropriate subject matter and/or applicability of the caller to the show's theme or subject matter.

[05] One known partial solution to the above problems is to store the telephone number for the call-in program in the mobile terminal's memory or phonebook. The user can then dial the number by recalling the number from the phonebook. However, recalling a telephone

number from memory can be tedious as the user navigates through the phonebook using the keys on the mobile terminal. Alternatively, the user may store the telephone number in voice selectable memory, and dial the number by speaking a name associated with the stored telephone number. This does not, however, alleviate all the problems recited above. The user must still remember the phone number long enough to enter it into the phonebook. In addition, the same shows often use different telephone numbers each day.

[06] Thus, it would be an advancement in the art to provide a method and system that audience members could use to call in to a call-in show without being required to receive and/or remember a telephone number. It would be a further advancement in the art to provide an automated system for receiving calls from audience members, and to handle the calls with little human assistance.

#### BRIEF SUMMARY OF THE INVENTION

[07] As more sophisticated mobile devices are developed, the same mobile device can be used for mobile telephony as is used for receiving radio and/or television broadcasts. For example, 3G cellular devices may receive radio as well as perform traditional mobile telephony operations. The invention provides a method, system, and mobile terminal for user participation in call-in broadcast programs, such as call-in radio and television shows, using such a device.

[08] A central call server can be used to receive requests from mobile terminals and forward each request to the proper broadcast program. When a user wants to call in to a show, the user inputs a generic command into her mobile terminal to contact the studio, and the mobile terminal sends the request to the call server. The request can include an indication of the present channel that the user is listening to or viewing on the mobile terminal. Upon receiving the request, the call server may use a lookup table to identify a show being broadcast on the indicated channel, and forwards the user request to the identified show. A show representative, such as the host, receives the requests, decides whether to accept or reject each one, and sends a response to the call server. Alternatively, a computer can automatically filter requests, for example, by accepting requests at random. When the request is accepted, the call server establishes a connection between the user's mobile terminal and a terminal associated with the show.

[09] A mobile device may be adapted for use with the inventive system by including a predetermined input device that initiates a request to the call server. When a user activates the input device, such as a button or predefined verbal command, e.g. "Contact Show", the mobile terminal sends a request to the call server, which proceeds as described above.

[10] A user can automatically tune to a radio or TV station, or any future broadcast means, by uttering the name of the station into the mobile terminal. The verbal identification may be preceded or accompanied by an indication that the verbal request is for a radio or TV station so that the mobile terminal does not need to compare the verbal input to non-radio and/or non-TV information, e.g., to names stored in the device's phone number directory.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[11] Figure 1 illustrates a block diagram of an automated call-in system according to an embodiment of the invention.

[12] Figure 2 illustrates a method for performing user participation in a call-in broadcast program according to an embodiment of the invention.

[13] Figure 3 illustrates a block diagram of a connection request message according to an embodiment of the invention.

#### DETAILED DESCRIPTION OF THE INVENTION

[14] FIG. 1 illustrates a block diagram of a call-in system according to an embodiment of the invention. The system generally includes one or more broadcast studios, a call-in server, and one or more mobile terminals. A mobile terminal user hears a broadcast inciting listeners to call in to the program. By pressing a button, the mobile terminal communicates with the call server to establish a connection to the program.

[15] A call server 101 may be implemented in a conventional computer acting as a central server for processing call-in requests. Alternatively, call server 101 may be distributed among multiple computers to reduce the load of any single server, depending on the size of the network within which the call server is used. In addition to traditional computer components and modules such as processor 102, call server 101 may include a studio

mapping table 103 and mobile device interface 105. Studio mapping table 103 stores a list of call-in broadcast programs and their respective studio access information, so that call server 101 may contact call-in shows based on callers' requests. The call server may contact each call-in program via telephone (voice or data connection), email, URL, or the like, as defined by each particular show's access information. It should be appreciated by one of skill in the art that other contact means may alternatively be used. For instance, the call server may contact a show representative using SMS or HTTP messages, TTS (text-to-speech) announcements, and the like.

[16] Call server 101 may be connected to a wireless communications network 107, through which the call server receives users' requests to contact a call-in program's studio. Call server 101 may further be connected to one or more radio and/or TV call-in program studios 109 and 111, to which call server 101 sends user requests. Each call-in program may have a show representative 113, 115. The show representative may be the individual hosting the show, or any other individual designated to receive and respond to users' call-in requests. Each show representative 113, 115 may receive and filter requests using a computer 117, a telephone 119, or other data processing device configured to receive and respond to users' requests to contact the studio. Each studio 109, 111 may be connected to a broadcast tower 121, 123, respectively, through which the call-in program is publicly or privately broadcast. Alternatively, programs may be broadcast to mobile terminals via data packets sent over a network (e.g., IP packets sent over the Internet), such as is known in the art with respect to Internet radio/TV broadcasting.

[17] Each broadcast may be received by a mobile terminal 125, 127, and 129. Each mobile terminal may comprise a handheld mobile telephone 127, personal digital assistant (PDA) (e.g., a Palm VII), a combination of the two such as a Nokia Communicator 129, mobile MP3 player, integrated multimedia player in an automobile, or the like, that is equipped with two-way wireless communications and is adapted to receive radio and/or TV broadcasts. For purposes of illustration only, mobile terminal 125 represents any of the aforementioned devices. In one embodiment, mobile device 125 may receive radio data stream (RDS) messages indicating that the user can call in to the studio using a "call studio" input device 130 on device 125, as further described below. Alternatively, the call-in show may announce over the radio that audience members may call in to the show. Input device 130 may comprise a keypad key, soft button, switch, or other input device known in the art.

[18] Mobile terminal 125 may also include a processor 131, memory (e.g., RAM, hard disk, etc.) 133, ROM 135, tuning circuit 137, transceiver 139, broadcast receiver 141, display screen 143, microphone 144, and camera 145.. Some elements may be optional or combined into one or more other elements. Each element may be performed via hardware, software, or a combination of the two. Software may be stored on a computer readable memory, such as a hard disk, floppy disk, or other computer readable medium. Tuning circuit 137 interprets user input for a selected broadcast station and directs broadcast receiver 141 to tune to the selected station. Transceiver 139 is used for communicating with wireless communications network 107. Display screen 143 may be used for displaying content to the user, such as menus, received DVB or television broadcasts received by broadcast receiver 141, and the like. Microphone 144 may be used to capture audio data into the mobile terminal, and camera 145 may be a digital camera or the like, and may be used to capture video or still image data into the mobile terminal.

[19] FIG. 2 illustrates a method for user participation in a call-in broadcast program according to an embodiment of the invention. A call-in program, such as a call-in radio show, is broadcast in step 201. In step 203, the show (via the show representative or other designated personnel) provides access information to call server 101. The access information may include a telephone number, an email address, an IP address, a URL, an SMS message address, or the like. In step 205, an audience member listening to or viewing the show decides to contact the show using her mobile device. The audience member, in step 207, inputs a command to contact the show. The command may be provided by pressing call activation input device 130 or any other input device for contacting the studio of a broadcast currently being received, or it may be issued by speaking a command, such as "Contact studio," or the equivalent in a specified implementation language (e.g., Finnish, Spanish, etc.), into a mobile device equipped with voice recognition capabilities. Other known input mechanisms and methods may alternatively be used. For example, in one embodiment it is also possible for the user to contact a radio show to which she is not currently listening. In this case a verbal command specific to a radio show may be spoken into the microphone, such as "Contact Radio Gaga."

[20] Upon instructing the mobile device to contact the studio, the mobile device may automatically send a request to contact the show to the call server in step 208. The mobile device may automatically generate the content (user ID, destination address, etc.) to include

in the request message, and send the message via SMS, HTTP, or other known data messaging technique, to the call server. The request may include a present condition of a dynamic variable, such as an indication of the current broadcast being received by the mobile device. The indication of the current broadcast being received may be the radio channel to which the device is tuned, or it may be a show identifier provided by an RDS message. The request may also include user profile information and location information, described below.

[21] In one embodiment, with only one call server, all requests are sent to the one call server. In another embodiment, where there is more than one call server, the wireless communications network routes the request to the appropriate call server (e.g., the closest call server, the call server with the lightest load, etc.). The request to contact the studio may then be processed by the call server based on the dynamic variable information. In one embodiment, the request includes an HTTP message identifying the audience member's mobile device ID, the request type and the current radio channel. In step 209, the call server uses the received information to look up the show's access information, and forwards the request to the show (e.g., to the studio from which the show is originating). The server may send the message to the studio in any known format, including email, SMS, HTTP, phone call with synthesized announcement, etc. Additionally, the request may be forwarded to a computer at the show studio, or to any other call screening device used by the show.

[22] In step 211, the show representative reviews the request and decides whether or not to accept the call-in request from that particular audience member. In one embodiment of the invention, to allow the show representative to make a better-informed decision regarding whether to accept each request, additional information may be included with each request. For instance, requests may include demographical and/or user profile information (age, gender, etc) regarding the requesting audience member. The demographical/user profile information may be automatically added to the request by the mobile telephone provider or the call server, when the information is known, and optionally when the audience member has specifically requested or signed up for such information to be provided. Additionally, the audience member may input a basic description of her request or the subject matter she would like to discuss, for example, via text message, audio clip, or the like.

[23] In one embodiment, the request sent to the show may include location information. The show representative may locate the user based on the location information, and introduce

the user to the show's general audience. In various embodiments, the location information may be added by the user, by the mobile terminal when such information is stored in the mobile terminal (e.g., GPS in the mobile terminal), by the call server when such information is stored in the call server, or by a base station in the mobile network when base stations have location determination capabilities (e.g., using techniques such as angle of arrival, time difference of arrival, etc.).

[24] The show representative may send a reject message, a request to establish a voice communication, or other appropriate announcement. For example, the show host may send an announcement to the audience member saying "Thanks for your call, your turn is 10 minutes from now." In one embodiment, the show representative may select from a number of predefined responses in order to expedite call screening. Predefined responses may include responses that immediately accept the request, immediately reject the request, store the request in one or more queues, etc.

[25] In an alternative embodiment, a computer may be used to automatically accept or reject requests according to predefined criteria, e.g., at random, every third request, etc. The predefined criteria may also be based on the demographic information or basic description, when available.

[26] The show representative may input the decision into the screening computer or other device being used to communicate with the call server. The screening computer, in step 213, sends the response back to the call server, which in turn may send the response back to the mobile device from which the initial command to contact the show was received. In step 215, the call server makes a determination of whether the show representative accepted the audience member's request to contact the show and, if so, the call server establishes a connection between the audience member's mobile device and a telephone associated with the show, in step 217. The call may be initiated immediately or at a predefined or otherwise given time. For instance, when the show host accepts a request but informs the requesting audience member that the delay is ten minutes, the call server may wait ten minutes before initiating a connection between the show host and the audience member. In addition, after the call server establishes the connection between the show host and the audience member, the call server may exit the communication, i.e., drop both lines, so that the call server is free to establish other connections and does not remain involved with past connections.

[27] It should be apparent to one of skill in the art that the above steps might not be required to be performed in the order in which they are illustrated. For instance, steps 201 and 203 may be performed in reverse order. In addition, one or more steps may be optional, such as step 213. Also, it is possible that the audience member, in step 205, decides to call in even though she is not listening to the show, as described above. In some embodiments, the show representative may contact the mobile device directly using information contained in the connection request, such as the user ID or contact information.

[28] In one embodiment of the invention, a radio show may want to be contacted even after the show is no longer on the air, e.g. to collect audience members' after-show comments. In such a case the audience member may send information to the call server identifying a specific show or a channel/time combination. Using this information, the call server may look up the show's contact information in table 103 and then proceed as described above. If the call server does not locate a past show based on the information supplied by the audience member, the call server may inform the audience member by sending an error message back to the mobile device from which the request was received.

[29] In one embodiment of the invention, the mobile terminal may send audio or video data to be broadcast as part of the show. For example, a mobile terminal may include captured audio or video data (from microphone 144 or camera 145, respectively) as part of the initial connection request. The show representative may then determine whether to rebroadcast the data via IP broadcast, DVB, or the like. In some embodiments, the data may only be rebroadcast to users who subscribe to the show or to the call server. For example, a mobile user may receive a DVB broadcast of a television talk show. The talk show host might encourage viewers to send in pictures of themselves doing funny things. A mobile user might take a picture with her mobile terminal using the built in digital camera, and send it to the talk show host using the invention described herein. The talk show host may then include the picture as part of the broadcast for the entire viewing audience to see.

[30] With reference to FIG. 3, a message 301 sent by a user to the call server requesting that audio and/or video data be sent to the show representative may include a terminal or user ID 303, a broadcast channel ID 305, a destination address 307, location information 309 (optional), and user profile information 311 (optional). Terminal/User ID 303 may comprise a contact address or some other identification specific to the user and/or the mobile terminal



from which the message is originating. Broadcast channel ID 305 may comprise information identifying the broadcast channel to which the message corresponds. Destination address 307 may comprise information identifying where the message should be sent, e.g., a call server number or address. Location information 309 and user profile information 311 (described above) are both optional.

[31] One of skill in the art will appreciate that many variations are possible that remain within the scope of the present invention. For example, the call server may be configured to offer users the option of indicating when they would like their request submitted to the show, and the call server may delay the request according to the user's preference. In another variation, a user may include in the request an indication of whether the user would like to be immediately connected to the show or whether the user would like to schedule a specific time to contact the show.

[32] While the above examples refer to call-in radio and TV programs, the principles taught herein may also be used to receive additional information regarding other types of broadcasts, including advertisements and game shows. For example, when an advertisement is being broadcast that a user wants to learn more about, the user can use the call activation input device 130 (FIG. 1) to request that the call server connect the mobile terminal to a third party associated with the advertisement (e.g., a sales representative). If a sales representative is available, the available sales representative may accept the connection request, and the call server establishes a new connection between the mobile terminal and the sales representative. At that point, the user of the mobile terminal can find out more information and/or order the product being advertised. In such an embodiment, the call server may receive advertisement information from a radio or TV station so that the call server knows presently broadcast advertisements on various channels when requests are received from users. Similarly, when a game show announces that interested people should call in to participate, the game show host (or other representative) may use the inventive system to screen, or randomly accept, potential contestants as discussed above.

[33] It should be apparent to one of skill in the art that, while the above examples are directed to mobile devices, the inventive methods and systems may also be used with non-mobile devices that receive broadcasts and perform telephony operations. In addition, the

principles taught herein may also be used with non-wireless systems, such as Internet radio, TV, telephony or any other future broadcast systems.

[34] While the invention has been described with respect to specific examples including presently preferred modes of carrying out the invention, those skilled in the art will appreciate that there are numerous variations and permutations of the above described systems and techniques that fall within the spirit and scope of the invention as set forth in the appended claims.